

WHAT IS CLAIMED IS:

- 1 1. A microdevice for supporting a flowing fluid, the microdevice
2 comprising:
3 a substrate; and
4 a pair of generally parallel, spaced wall members on the substrate, wherein
5 at least one of the wall members includes a pair of structures defining an opening.
- 1 2. The microdevice of claim 1 wherein the pair of structures are
2 beveled structures.
- 1 3. The microdevice of claim 1 wherein the pair of structures are
2 beveled structures, and wherein each of the beveled structures comprises a pair of
3 inwardly tapering wall surfaces terminating in an apex.
- 1 4. The microdevice of claim 3 wherein each of the tapering wall
2 surfaces form an angle of about 2 degrees to about 20 degrees with respect to a side
3 surface of an intermediate portion of the wall member.
- 1 5. The microdevice of claim 3 wherein each tapering wall surfaces is
2 curved.
- 1 6. The microdevice of claim 1 wherein a distance between the pair of
2 structures is about 50 microns to about 400 microns.
- 1 7. The microdevice of claim 1 comprising three or more generally
2 parallel wall members on the substrate.
- 1 8. The microdevice of claim 1 wherein the spaced wall members
2 define a fluid channel that contains a fluid with a laminar flow profile.
- 1 9. The microdevice of claim 1 further comprising a cover disposed on
2 the wall members.
- 1 10. The microdevice of claim 1 wherein each of the wall members
2 include an opening, and wherein the openings in the respective wall members are
3 substantially aligned to form a slot.

1 11. The microdevice of claim 1 further comprising a slide member,
2 wherein the slide member is disposed on the substrate and is adapted to slide through the
3 opening.

1 12. An analytical assembly comprising:
2 the microdevice of claim 1; and
3 a probe having an end portion that is insertable between the spaced wall
4 members.

1 13. A microdevice comprising:
2 a substrate;
3 a plurality of wall members; and
4 a plurality of fluid channels, wherein each of the fluid channels is defined
5 by adjacent wall members in the plurality of wall members, wherein each wall member
6 comprises an opening that is formed by opposed beveled structures of the wall member
7 and that communicates the adjacent fluid channels.

1 14. The microdevice of claim 13 wherein the openings in the
2 respective wall members are substantially aligned to form a slot.

1 15. The microdevice of claim 13 wherein the openings in each of the
2 wall members are structured to permit fluids having a laminar profile flowing on opposite
3 sides of respective wall members from intermixing.

1 16. The microdevice of claim 13 further comprising a cover on the
2 wall members and a lid spaced from the cover.

1 17. A method for detecting a characteristic of a fluid, the method
2 comprising:

3 (a) inserting a probe into a fluid channel in a microdevice;
4 (b) detecting a characteristic of a first fluid flowing in the first fluid
5 channel;

6 (c) moving the probe from the first fluid channel through an opening in
7 one of the wall members defining the first fluid channel and to a second fluid channel
8 adjacent to the first fluid channel; and

9 (d) detecting a characteristic of a second fluid flowing through the second
10 fluid channel.

1 18. The method of claim 17 wherein the probe comprises an electrical
2 sensor.

1 19. The method of claim 17 wherein at least the first fluid contains
2 proteins.

1 20. The method of claim 17 wherein each of the fluid channels has a
2 width less than about 1000 microns.

1 21. The method of claim 17 wherein the first and the second fluids
2 comprise a laminar profile.

1 22. The method of claim 17 wherein (b)-(d) are performed without
2 exposing an end portion of the probe to air.

1 23. An analytical assembly comprising:
2 a detection assembly comprising a plurality of detection devices; and
3 a microdevice comprising a plurality of wall members and a plurality of
4 fluid channels, wherein each of the fluid channels is defined by adjacent wall members in
5 the plurality of wall members.

1 24. The analytical assembly of claim 23 wherein the plurality of
2 detection devices comprise a plurality of probes.

1 25. The analytical assembly of claim 23 wherein the plurality of
2 detection devices comprise a plurality of optical detectors.

3 26. The analytical assembly of claim 23 wherein the detection devices
4 are disposed in the fluid channels in the microdevice.

1 27. A method for detecting a characteristic of a fluid, the method
2 comprising:

3 flowing a plurality of different fluids through respective fluid channels in a
4 microdevice, each of the fluid channels in the microdevice being formed by adjacent pairs
5 of wall members; and

6 detecting characteristics of the plurality of different fluids substantially
7 simultaneously using a plurality of detection devices as the different fluids flow through
8 their respective fluid channels.

1 28. The method of claim 27 wherein the detection devices comprise a
2 plurality of probes, wherein the plurality of probes is insertable within the plurality of
3 fluid channels.